

CLAIMS

1) A method of cutting a substrate comprising the steps of:

- 5 a) focusing laser energy onto a point on the substrate so as to provide a laser focus point on the substrate;
- b) effecting relative lateral movement between the said laser focus point and the said substrate so that the said point follows a first path on the said substrate, a first layer of the said substrate being removed along the said first path so as to reveal a second layer of the said substrate;
- 10 c) refocusing the laser energy onto the said second layer, so that the laser focus point is located on the said second layer; and
- d) effecting relative lateral movement between the said laser focus point and the said substrate so that the said point again follows substantially the said first path on the said substrate, whereby a second layer of the said substrate is removed along the said first path.
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2. A method according to claim 1 wherein steps c) and d) are repeated, a further layer of the substrate being removed with each repetition, until all layers of the substrate have been removed along the said first path.

20 3) A method according to claim 1 wherein the laser energy used has a wavelength in the ultra-violet to visible range.

4) A method according to claim 3 wherein the laser energy used has a wavelength greater than 500 nm.

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5) A method according to claim 4 wherein the laser energy used has a wavelength of 532 nm.

6) A method according to claim 1 wherein a fluid flow is directed towards the cut region.

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7) A method according to claim 6 wherein the said fluid is air.

8) A method according to claim 1 wherein the substrate is provided with a plurality of Integrated Circuit (IC) units formed thereupon, the method being used to singulate the various units.

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9) Apparatus for cutting a substrate comprising:

- a) a laser beam source;
- b) focusing means for focusing the said laser beam onto a particular point on the substrate so as to provide a laser focus point on the substrate;
- c) relative motion generating means for effecting relative lateral movement between the said laser focus point and the said substrate so that the said point follows a first path on the said substrate, a first layer of the said substrate being removed along the said first path so as to reveal a second layer of the said substrate;

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refocusing means being provided to refocus the laser beam onto the said second layer, relative motion between the laser focus point and the substrate again being effected along the said first path so as to remove a second layer of the said substrate along the said path.

10) Apparatus according to claim 9 wherein the focusing means comprises a lens arrangement; the refocusing means comprising means for effecting relative vertical movement between the lens arrangement and the substrate.

5 11) Apparatus according to claim 9 wherein the laser beam wavelength is in the ultra-violet to visible range.

12) Apparatus according to claim 11 wherein the laser beam wavelength is greater than 500 nm.

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13) Apparatus according to claim 12 wherein the laser beam wavelength is 532 nm.

14) Apparatus according to claim 9 wherein means are provided to direct a fluid flow towards the cut region.

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15) Apparatus according to claim 14 wherein the said fluid is air.

16) Apparatus according to claim 9 wherein the substrate is provided with a plurality of Integrated Circuit (IC) units formed thereupon, the apparatus being used to singulate the
20 various units.